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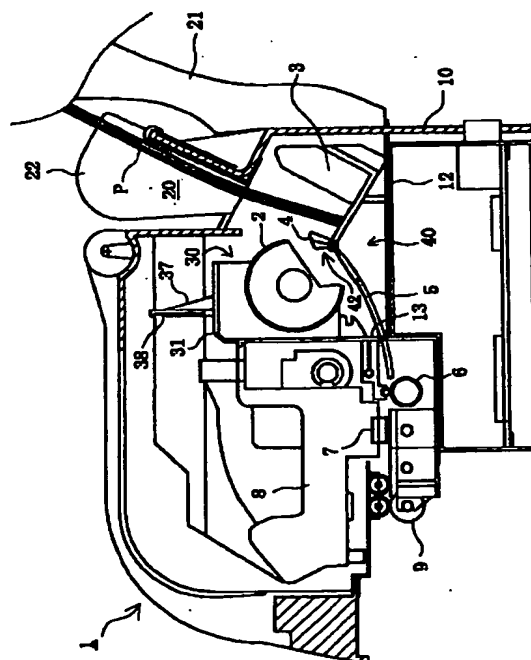
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## (54) 【発明の名称】 給紙装置

## (57) 【要約】

【課題】 紙戻し部材に用紙を1枚ずつ分離して給送する機能を持たせること。

【解決手段】 給紙装置20は給紙ローラ2を組込んだユニット(A)30と、ホッパー3、分離バット4を有する紙戻し部材42を、ペーパーガイド5を形成したフレーム41に一体化したユニット(B)40とを含んで構成される。ユニット(B)は断面山形のフレーム41の稜線部分に沿って紙戻し部材42の基端42bが回転可能に設けられている。紙戻し部材は給紙ローラの回転押付け力により用紙を分離給送する倒伏位置と給紙ローラのホームポジションで起立位置へ回転可能になっており、バネ47で起立位置へ付勢されている。紙戻し部材を倒伏位置から起立位置に向けて回転するとき、重送された用紙をホッパーに戻す。



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# 【特許請求の範囲】

【請求項1】 用紙を給紙ローラで給送する給紙装置において、

複数枚の用紙を積載するホッパーと、

高摩擦材の分離パッドと、

前記分離パッドを取り付けた面を有し、前記ホッパーの最上位の用紙を給紙ローラに押し付けて分離すると共に、前記面により重送された用紙を前記ホッパーに戻す紙戻し部材と、を備え、

前記紙戻し部材は、ホッパーの側方に延びる基端を有し、該基端をホッパーの前端近傍に位置させ、該基端を支点として給紙ローラとの共働により用紙を給送する倒伏位置と該給紙ローラに干渉しない起立位置へ回動可能に設けられていると共に、給紙ローラが用紙を給送しない状態になったとき紙戻し部材を前記倒伏位置から起立位置に向けて回動させ、重送された用紙をホッパーに戻すことを特徴とする給紙装置。

【請求項2】 請求項1において、給紙ローラから幅方向の中央寄りに補助ローラを備え、給紙時に紙戻し部材の面で用紙を前記補助ローラに押し付けて給送を行うことを特徴とする給紙装置。

【請求項3】 請求項1又は2において、紙戻し部材の起立位置は、用紙搬送路を速ってホッパーに積載した用紙の用紙搬送路への進入を阻止する位置であることを特徴とする給紙装置。

【請求項4】 請求項1において、紙戻し部材を給紙ローラ側に回動させ、分離パッドを給紙ローラに押し付けるよう作用する付勢手段を備え、該給紙ローラの回転押付け力により紙戻し部材を前記付勢手段の付勢力に抗して倒伏位置へ回動させることを特徴とする給紙装置。

【請求項5】 請求項4において、紙戻し部材を給紙ローラの給送方向への回転に連動させて起立位置から倒伏位置に向けて所定角を回動させる傾動手段を備え、前記紙戻し部材を所定角回動させた後に、給紙ローラが直接紙戻し部材に作用して倒伏位置へ回動させることを特徴とする給紙装置。

【請求項6】 請求項5において、傾動手段は用紙搬送路の幅方向の外側に配置されていることを特徴とする給紙装置。

【請求項7】 請求項6において、傾動手段はカム機構が用いられ、紙戻し部材は用紙搬送路の領域外に突出形成された側端を有し、前記カム機構は紙戻し部材の側端に設けられたカムフォロアと、給紙ローラの回転に伴って前記カムフォロアに作用するカムとから構成されていることを特徴とする給紙装置。

【請求項8】 請求項1において、ホッパーを上昇又は下降可能に支持すると共に、給紙動作により前記ホッパーを上昇又は下降させるホッパー上下用カム機構を備え、前記ホッパーの上昇タイミングは紙戻し部材が倒伏位置に到達した後であることを特徴とする給紙装置。

【請求項9】 請求項1において、紙戻し部材の倒伏位置から起立位置への回動タイミングはホッパーを下降させた後であることを特徴とする給紙装置。

【請求項10】 請求項8又は9において、ホッパーは幅方向の一端側を支点に回動させる構造とし、該支点が給紙ローラの配置された側とは反対側に設けられていることを特徴とする給紙装置。

【請求項11】 請求項10において、ホッパーは給紙ローラに対してホッパー面が一定の傾きを保った状態で上昇又は下降することを特徴とする給紙装置。

## 【発明の詳細な説明】

### 【0001】

【発明の属する技術分野】本発明は、プリンタ等の記録装置に用いられ、ホッパーに積載されたシート状の用紙を給送する給紙装置に係り、特に重送された用紙をホッパーに戻す紙戻し部材に用紙を1枚ずつ分離して給送する機能を持たせた給紙装置に関する。

### 【0002】

【従来の技術】記録装置に用いられる給紙装置は、用紙の幅方向に2つの給紙ローラを配置し、一つの給紙ローラは一方のサイドエッジ側に固定配置され、他方はエッジガイドに組み込まれ、用紙幅に合わせて移動可能な半固定に配置されている。ホッパーの基端は、用紙の進入方向に対し直角な軸に回動可能に取り付けられ、給紙ローラの回転に連動したカム機構によって用紙の幅方向の全体を同じ動作により上昇又は下降を行うよう構成されている。ホッパーから1枚ずつ分離して給送する為に分離パッドを設けた分離パッドホルダが回動可能に取り付けられている。

【0003】ホッパーの上昇により用紙を給紙ローラに当接させ、同時に分離パッドを給紙ローラに押し付けると、最上位の用紙が分離給送される。用紙が搬送ローラに到達しスキュー取りが終了すると、給紙ローラはホームポジションに回転し停止される。この間、用紙先端と記録ヘッドとの距離を一定にする頭出し動作が行われ、その後印刷が開始される。前記給紙ローラがホームポジションに停止された状態では給紙ローラと分離パッドとの間に隙間が形成されるが、印刷中の用紙の一部が存在している。このとき重送された用紙が隙間に入り込み、場合によっては2以上重なって送られた用紙も印刷中の用紙に共連れられて給送されることもある。このような不具合の対策として、常時分離パッドにアイドルローラが押し当てられている。給紙ローラと分離パッドの間に印刷中の用紙があるとき、この用紙をアイドルローラで分離パッドに押し当てることで、重送した用紙の進入を防止している。進入を阻止された用紙は、印刷終了後に紙戻しレバーを作動させ、ホッパーに押し戻される。

### 【0004】

【発明が解決しようとする課題】従来の給紙装置では、分離パッドホルダと紙戻しレバーを別々に構成している

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為、構造が複雑になり、部品点数も多く、コスト高の要因となっていた。また紙戻し動作は、印刷後に行われていたので、紙戻し終了後でないと次の給紙動作を開始させることができないから前の用紙の印刷終了から次の用紙の印刷開始までの時間（スループット）が長くなる。更に、印刷中の用紙はアイドルローラに押し当てられているため、用紙との接触負荷が生じ、モータ駆動系の負荷となるなどの問題があった。本発明の目的は、紙戻し部材に用紙を1枚づつ分離して給送する機能を持たせた給紙装置を提供することにある。また本発明の他の目的は、印刷中に紙戻し動作を行えるようにした給紙装置を提供することにある。

## 【0005】

【課題を解決するための手段】請求項1の発明は、用紙を給紙ローラで給送する給紙装置において、複数枚の用紙を積載するホッパーと、高摩擦材の分離パッドと、分離パッドを取り付けた面を有し、ホッパーの最上位の用紙を給紙ローラに押し付けて分離すると共に、前記面により重送された用紙を前記ホッパーに戻す紙戻し部材とを備え、紙戻し部材は、ホッパーの側方に延びる基端を有し、該基端をホッパーの前端近傍に位置させ、該基端を支点として給紙ローラとの共働により用紙を給送する倒伏位置と該給紙ローラに干渉しない起立位置へ回動可能に設けられていると共に、給紙ローラが用紙を給送しない状態になったとき紙戻し部材を倒伏位置から起立位置に向けて回動させ、重送された用紙をホッパーに戻すことを特徴とする。請求項1の発明によれば、紙戻し部材に分離パッドを取り付けたので、従来のように分離パッドホルダと紙戻しレバーとを別々に構成する場合と比べて部品点数を減らすことができ、構造の簡素化によりコスト低減が図れる。

【0006】請求項2の発明は、請求項1において、給紙ローラから幅方向の中央寄りに補助ローラを備え、給紙時に紙戻し部材の面で用紙を補助ローラに押し付けて給送を行うことを特徴とする。請求項2の発明によれば、給紙ローラから幅方向の中央寄りに補助ローラを設けたことにより、給紙ローラによる巻込み進入の無い用紙の他端の動きが抑えられ、スキューを起こし難くし、スキューによる紙ジャムの発生を防ぐことができる。

【0007】請求項3の発明は、請求項1又は2において、紙戻し部材の起立位置は、用紙搬送路を遮ってホッパーに積載した用紙の用紙搬送路への進入を阻止する位置であることを特徴とする。請求項3の発明によれば、非給紙時に紙戻し部材を起立させておくことにより用紙の先端が規制され、用紙搬送路へ不用意に進入するのを阻止できる。

【0008】請求項4の発明は、請求項1において、紙戻し部材を給紙ローラ側に回動させ、分離パッドを給紙ローラに押し付けるよう作用する付勢手段を備え、該給紙ローラの回転押付け力により紙戻し部材を付勢手段の

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付勢力に抗して倒伏位置へ回動させることを特徴とする。請求項4の発明によれば、紙戻し部材の倒伏位置への回動が給紙ローラの回転押付け力によって行われるので、給紙ローラに対し紙戻し部材が常に当接され、紙戻し部材の用紙の押え付けが確実になる。

【0009】請求項5の発明は、請求項4において、紙戻し部材を給紙ローラの給送方向への回転に連動させて起立位置から倒伏位置に向けて所定角を回動させる傾動手段を備え、前記紙戻し部材を所定角回動させた後に、給紙ローラが直接紙戻し部材に作用して倒伏位置へ回動させることを特徴とする。請求項5の発明によれば、倒伏位置への紙戻し部材の回動は傾動手段による初期回動と給紙ローラの回転押付け力による本回動が連続して行われるので、紙戻し部材を無理なく円滑に回動させることができると共に、ホッパーから給紙ローラまでの用紙搬送路が紙戻し部材によってほぼ閉じられ、不用意な用紙の進入を阻止できる。

【0010】請求項6の発明は、請求項5において、傾動手段は用紙搬送路の幅方向の外側に配置されていることを特徴とする。請求項6の発明によれば、紙戻し部材の上に紙ジャムの用紙があった状態で傾動手段が作動しても前記用紙にダメージを与えることがない。

【0011】請求項7の発明は、請求項6において、傾動手段はカム機構が用いられ、紙戻し部材は用紙搬送路の領域外に突出形成された側端を有し、カム機構は紙戻し部材の側端に設けられたカムフォロアと、給紙ローラの回転に伴ってカムフォロアに作用するカムとから構成されていることを特徴とする。請求項7の発明によれば、傾動手段をカム機構にすることにより、構造が簡素化される。

【0012】請求項8の発明は、請求項1において、ホッパーを上昇又は下降可能に支持すると共に、給紙動作によりホッパーを上昇又は下降させるホッパー上下用カム機構を備え、ホッパーの上昇タイミングは紙戻し部材が倒伏位置に到達した後であることを特徴とする。請求項8の発明によれば、紙戻し部材が起立状態又は倒伏位置へ向う途中でホッパーが上昇し用紙の差し込みが開始されると紙戻し部材によって用紙先端が折損する恐れがあるが、ホッパーの上昇タイミングを紙戻し部材の倒伏位置への到達後にすることで、前記不具合を確実に防止できる。

【0013】請求項9の発明は、請求項1において、紙戻し部材の倒伏位置から起立位置への回動タイミングはホッパーを下降させた後であることを特徴とする。請求項9の発明によれば、最上位の用紙の給紙完了後に作動する紙戻し部材の起立復帰により、重送された用紙を確実にホッパー内に戻すことができる。この動作が給紙中に行われることにより、スループットが向上される。また印字中、紙戻し部材が起立位置にあるので、従来のように余分な用紙が用紙搬送路に進入するのを阻止するアイ

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ドルローラが不要となり、紙戻し部材と給紙ローラの間の接触負荷を低減できる。

【0014】請求項10の発明は、請求項8又は9において、ホッパーは幅方向の一端側を支点に回転させる構造とし、該支点が給紙ローラの配置された側とは反対側に設けられていることを特徴とする。請求項10の発明によれば、ホッパーの回転支点が給紙ローラの配置された側とは反対側に設けられているので、ホッパーの縦幅を狭くすることができ、ホッパーの小型化が図れると共に、1つの給紙ローラに接離する構造により、部品点数を削減することができる。

【0015】請求項11の発明は、請求項10において、ホッパーは給紙ローラに対してホッパー面が一定の傾きを保った状態で上昇又は下降することを特徴とする。請求項11の発明によれば、ホッパーの上昇又は下降動作において、ホッパーの面は給紙ローラに対して一定の傾きが保たれるので、用紙枚数が変動しても分離パッドへの進入角度が変わらず、安定した給紙が行われる。

【0016】

【発明の実施の形態】本願発明の実施の形態を説明する。図1は本発明に係る給紙装置を適用した記録装置の横断面図である。記録装置1は、給紙ローラ2の回転によりホッパー3に積載された複数枚の用紙Pを分離パッド4で給紙ローラ2に押付けて1枚ずつ分離し、ペーパーガイド5に沿わせて搬送ローラ6に給送し、スキュー取りした後、印字タイミングに合わせて記録領域へ送り、記録ヘッド7を搭載したキャリッジ8の副走査方向の往復運動により印字を行った後に排出ローラ9にて排出する。

【0017】記録装置1のハウジング10にはペーパーサポート21を取り付け、このペーパーサポート21に支えられた用紙Pの側縁を規制する為のエッジガイド22がハウジング10に摺動可能に設けられている。エッジガイド22と給紙ローラ2との間にはホッパー3が回転可能に設けられており、このホッパー3を上昇させたとき分離パッド4が最上位の用紙を給紙ローラ2に押し付けて分離し給送する。

【0018】給紙装置20は、給紙ローラ2、補助ローラ33、ローラ駆動ギヤ35などを組込んで一体化したユニット(A)30と、ホッパー3、分離パッド4を有する紙戻し部材42をフレーム41に組込んで一体化したユニット(B)40とを含み、ユニット(A)30はキャリッジ10とを仕切るフレーム13の背面に固定され、ユニット(B)40は断面山形のフレーム41の裾部分が搬送ローラ6と排出ローラ9を結ぶ用紙搬送経路の略延長線になるようメインフレーム12に取り付けられている。これらユニット化により記録装置への組立て工数を減らすと共に、組み付け後のユニットの調整を少なくすることができる。

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【0019】ユニット(A)及びユニット(B)を更に詳しく説明する。図2はユニット(A)の平面図、図3は図2のI-I矢視の側面図、図4はユニット(B)の平面図、図5は図4のII-II矢視の側面図、図6は図4のIII-III断面による紙戻し部材の作動を示す説明図、図7は紙戻し部材の平面図、図8は図7のIV-IV矢視の側面図、図9は図7のV-V矢視の側面図、図10はユニット(A)とユニット(B)の組付け時の斜視図である。

【0020】図2において、ユニット(A)30はローラホルダ31の軸受け部31aにローラ軸32が回転可能に支持され、このローラ軸32には給紙ローラ2及び補助ローラ33がそれぞれ設けられている。ローラ軸32には、ホッパー3の上昇又は下降を操作するホッパーカム機構を構成するホッパー上下用カム34及び回転駆動する為の伝達ギヤ35が設けられている。ホッパー上下用カム34の側面には、後述の紙戻し部材42の倒伏動作における初期傾倒動作を行う小カム36が設けられている。伝達ギヤ35は、図示を省略した給紙モータの駆動ギヤに中間伝達ギヤを介して連係されている。

【0021】給紙ローラ2は、図3に示すように円弧部分2aと平坦部分2cからなり、円弧部分2aには用紙を給送する為に摩擦材が取り付けられている。円弧部分2aは、平坦部分2cに出張った円弧部分2bを持せて全体の円弧長を大きくしている。円弧部分2bは、ホッパー3の用紙積載量に変化しても搬送ローラ6まで用紙を確実に給送するよう作用する。ホッパー3に1枚の用紙がある場合は、ホッパー3を下限位置から上昇させ、用紙を給紙ローラ2へ当接させるまでの時間が最も長くなる。つまり、給紙ローラ2は用紙の当接までの間に所定角回転するので、円弧部分2bの長さは用紙の当接位置からの給送で搬送ローラ6へ到達するよう設定される。このように給紙ローラ2の平坦部分2c側に出張った円弧部分2bを設けることで、給紙ローラ2を大径にすることなく、全体の円弧部分2aを長くすることができ、装置の小型化が図れる。

【0022】ホッパー3に収納された用紙を幅方向の一方側に配置された1つの給紙ローラ2で給送する場合、用紙の一方側においては給紙ローラ2に巻き込まれて用紙側部がカールして進入する。用紙の他側においては給紙ローラ2が無い為、真っ直ぐな状態で進入する。このように用紙の幅方向において、異なった進入を基に用紙搬送が行われるとスキューが起り、紙ジャムを発生し易くなる。用紙の幅方向の片側のみに給紙ローラ2を配置した方式による上記不具合を解消するため、給紙ローラ2から離れた幅方向の中央寄りに補助ローラ33が配設されている。

【0023】補助ローラ33は、給紙ローラ2と同軸上に配置され、用紙を紙戻し部材42の補助パッド4Aによって押し付け、用紙の幅方向の中央寄りを給紙ローラ

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と同じように巻き込むよう機能する。補助ローラ33を備えることで、用紙の他端の動きが抑えられ、スキューを起こし難くなる。符号37は、記録ヘッド7に印字信号を送るフラットケーブル38を保持する為にフレーム31に設けられたフラットケーブル係止部(図1参照)である。

【0024】ユニット(B)40は、記録装置1の幅方向に延びた断面山形のフレーム41の前方傾斜面をペーパーガイド5にし、後方傾斜面にはホッパー3が配置されていると共に、フレーム41の頂上には稜線部分41bに沿って紙戻し部材42が配置され、その基端が稜線部分41bに回動可能に設けられている。ホッパー3は、記録装置1の幅方向の一端を支点43としてフレーム41の傾斜面に沿って回動可能に取り付けられており、他端はユニット(A)30側に位置し、ホッパーエッジガイド3aが設けられ、その上端面はホッパー上下用カム34が作用するホッパーカムフォロア3cを形成している。ホッパーエッジガイド3aから外方へ延びた突出部分3bが形成されており、この突出部分3bがフレーム41から立設されたホッパーガイド41aに嵌入され、ホッパー3の他端の動きを上昇又は下降方向のみに規制している。

【0025】ホッパー3の回動支点43は、その近傍のホッパー面が稜線部分41bにほぼ一致するように設けられており、用紙セット時に用紙先端がホッパー3の回動支点43側のフレーム41に引掛かるのを防止している。また、ホッパー3の他端の近傍背面には、フレーム41との間にホッパーバネ44が介装され、ホッパー3を傾斜面の頂き方向に付勢している。ホッパー3の面には、分離パッド4の位置に合わせて高摩擦材のシート45が貼付けられている。

【0026】紙戻し部材42は、軸受け構造に形成された基端42bをフレーム41の軸部に嵌め込むことによって、回動可能に取り付けられている。紙戻し部材42の表面42cには、離間して配置された分離パッド4と補助パッド4Aを有する。ホッパー3のエッジガイド3a側には、紙戻し部材42の初期傾倒を行う為のカムフォロア42aが設けられており、このカムフォロア42aにはホッパー上下用カム34の側面に設けられた小カム36が作用する。ここで、小カム36とカムフォロア42aは、紙戻し部材42を給紙ローラ2の給送方向への回転に連動させて起立位置から倒伏位置に向けて所定角を回動させる傾動手段を構成している。

【0027】基端42bとは反対側の自由端は、分離パッド4の幅を除く部分に表面42cから斜め上方に僅かに延びた土手部42dが形成されており、この土手部42dは紙戻し時に用紙先端を確実に捉えてホッパー3へ押し戻すよう作用する。ペーパーガイド5には、紙戻し部材42と略同形の切欠き部46が形成されており、この切欠き部46は、紙戻し部材42が起立状態(図6

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(1)の状態)から紙戻し部材用バネ47の付勢力に抗して回動し倒伏(図6(2)の状態)したときに覆われ、ペーパーガイド5に面一になる。紙戻し部材用バネ47は、例えばコイルスプリングで構成されており、フレーム41の裏側に配設されている。紙戻し部材用バネ47の一端は、紙戻し部材42の裏面に、他端はフレーム41にそれぞれ係止され、紙戻し部材42を起立(図5の状態)させるよう付勢している。

【0028】紙戻し部材42の起立は、ほぼ垂直に立ち上がっており、セット時の用紙が用紙搬送路に不用意に進入するのを阻止する。この起立状態では、給紙ローラ2のローラ面の回転軌跡外に紙戻し部材42があつて回動力を与えることができない。そこで、紙戻し部材42に回動力を作用させる部分を給紙ローラ2のローラ面の回転軌跡内に入れる為、給紙動作の給紙ローラ2の回転初期において、小カム36とカムフォロア42aにより給紙ローラ2の回転に連動して紙戻し部材42を所定角の初期回動させる。その後、給紙ローラ2の回転押付け力が紙戻し部材42に直接作用し、回動させる。これにより紙戻し部材42を無理なく円滑に回動させることができる。ホッパー3の回動支点側には、稜線部分41bに近いペーパーガイド5上に用紙受け部48が形成されており、この用紙受け部48はホッパー3の回動支点43側が幅広で中央に向かって幅狭になる上視三角平面を持っており、これにより積載した用紙の荷崩れが防止される。

【0029】図11は紙戻し部材を倒伏させるときの初期回動を行う傾動手段の他の実施例を示す斜視図である。分離パッド4の両側方には、紙戻し部材42の自由端に向けて溝カム42eが形成されている。給紙ローラ2の両側のフランジ2dには、紙戻し部材42の溝カム42eに作用する小カム36aが設けられている。給紙ローラ2のローラ面が紙戻し部材42の分離パッド4に接触するのに先立って小カム36aが溝カム42aに作用し紙戻し部材42を所定角の初期回動させる。その後における紙戻し部材42の倒伏動作は、前記実施例と同様である。

【0030】次に給紙動作を説明する。図12～図24は給紙動作の流れを示す説明図である。複数枚の用紙Pをペーパーサポート21にセットする。ホームポジションにある給紙ローラ2の平坦部分はフレーム41のペーパーガイド5の面にほぼ平行であり、紙戻し部材42は起立して給紙ローラ2との間で干渉しない状態となっている。紙戻し部材42の起立時は、給紙ローラ2とホッパー3との間の用紙搬送路を遮る位置にあつて、用紙セット時に用紙の先端を規制することで、用紙搬送路に進入するのを阻止する働きを持っている。一方、ホッパー上下用カム34により、ホッパー3が下限位置に押し下げられている(図12の状態)。給紙スタートにより給紙ローラ2が回転すると、先ず小カム36が紙戻し部材4

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2のカムフォロア42aに作用して紙戻し部材42を僅かに傾けて倒伏の初期動作が行われる(図13の状態)。紙戻し部材42が所定角傾けられた後に、給紙ローラ2が紙戻し部材42の表面に当たって、そのときの回転押付け力により紙戻し部材用バネ47の付勢に抗して紙戻し部材42を倒伏位置に向けて回転させる。この間、ホッパー上下用カム34がホッパーカムフォロア3cに作用し、ホッパー3を下限位置に維持する(図14の状態)。紙戻し部材42が倒伏位置に達し(図15の状態)、その後ホッパー上下用カム34によるホッパー3の下限位置の維持が解かれ、ホッパーバネ44によってホッパー3が上昇し、最上位の用紙を給紙ローラ2に押し付ける(図16の状態)。給紙ローラ2の回転により最上位の用紙の給送が始まる(図17の状態)。なお、図中、上向き矢印により用紙先端の位置を示す。用紙先端が搬送ローラ6に到達する前に、ホッパー上下用カム34がホッパーカムフォロア3cに作用し、ホッパー3を図18に示す下降直前の位置から下降を開始する(図19は下降途中の状態)。ホッパー3が下限位置に到達し(図20)、その後紙戻し部材42の起立動作が紙戻し部材用バネ47のバネ力で始まる(図21は起立直前の状態)。この間において、用紙先端は搬送ローラ6に到達し、スキュー取り及び頭出し動作が行われる。

【0031】引続き、紙戻し部材用バネ47のバネ力により紙戻し部材42の起立が完了する。この起立する為の回転中に、先の動作において最上位の用紙Pに共連れし給紙ローラ2と紙戻し部材42の間にくさび効果によって入り込んだ重送の用紙P1の先端を捉え、ホッパー3内に押し込んで収容する紙戻しが行われる(図22は紙戻し完了時、図23は紙戻し完了後の給紙ローラ2のホームポジションへの回転途中の状態)。給紙ローラ2がホームポジションに戻る間に、用紙Pへ印刷が始まる(図24の状態)。

#### 【0032】

【発明の効果】本発明によれば、紙戻し部材に分離パッドを取り付けたので、従来のように分離パッドホルダと紙戻しレバーとを別々に構成する場合と比べて部品点数を減らすことができ、構造の簡素化によりコスト低減が図れる。また、非給紙時に紙戻し部材を起立させておくことにより、用紙が用紙搬送路へ不用意に進入するのを阻止できる。

#### 【図面の簡単な説明】

【図1】本発明に係る給紙装置を適用した記録装置の横断面図である。

【図2】ユニット(A)の平面図である。

【図3】図2のI-I矢視の側面図である。

【図4】ユニット(B)の平面図である。

【図5】図4のII-II矢視の側面図である。

【図6】図4のIII-III断面による紙戻し部材の作動を示す説明図である。

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【図7】紙戻し部材の平面図である。

【図8】図7のIV-IV矢視の側面図である。

【図9】図7のV-V矢視の側面図である。

【図10】ユニット(A)とユニット(B)の組付け時の斜視図である。

【図11】紙戻し部材を倒伏させるときの初期回転を行う傾動手段の他の実施例を示す斜視図である。

【図12】給紙ローラがホームポジションのときのホッパー、紙戻し部材の関係を示す図である。

【図13】小カムにて紙戻し部材を倒し始めを示す図である。

【図14】給紙ローラが分離パッドに当接した状態を示す図である。

【図15】紙戻し部材の倒伏位置を示す図である。

【図16】ホッパーが上昇した直後を示す図である。

【図17】給紙中を示す図である。

【図18】ホッパーが下降を始める直前を示す図である。

【図19】ホッパーの下降途中を示す図である。

【図20】ホッパーが下限に到達した状態を示す図である。

【図21】紙戻し部材が起立動作を開始する直前を示す図である。

【図22】紙戻し部材が起立位置に達し紙戻し完了を示す図である。

【図23】紙戻し完了後の給紙ローラの回転を示す図である。

【図24】給紙ローラがホームポジションに戻った状態を示す図である。

#### 【符号の説明】

- 1 記録装置
- 2 給紙ローラ
- 3 ホッパー
- 3c ホッパーカムフォロア
- 4 分離パッド
- 5 ペーパーガイド
- 6 搬送ローラ
- 7 記録ヘッド
- 8 キャリッジ
- 9 排出ローラ
- 10ハウジング
- 12 メインフレーム
- 20 給紙装置
- 21 ペーパーサポート
- 22 エッジガイド
- 30 ユニット(A)
- 33 補助ローラ
- 34 ホッパーカム
- 36, 36a 小カム
- 40 ユニット(B)

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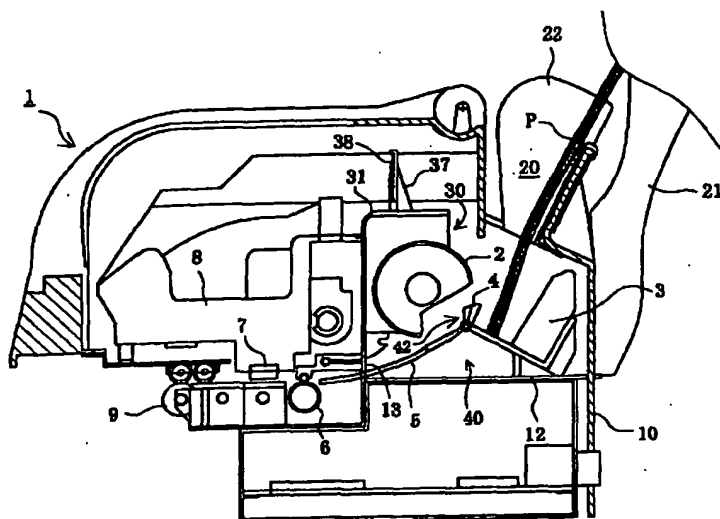
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12

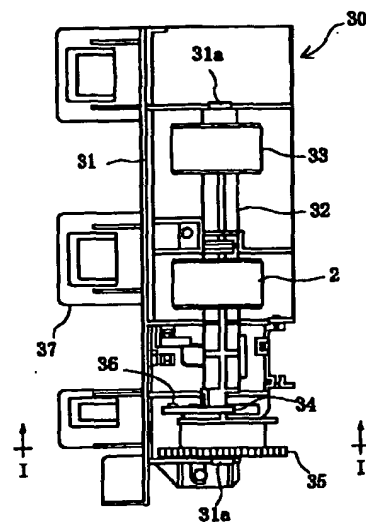
42 紙戻し部材  
42a カムフォロア

42e 溝カム  
48 用紙受け部

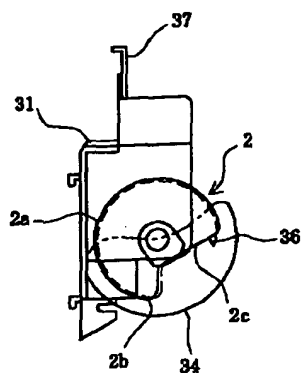
【図1】



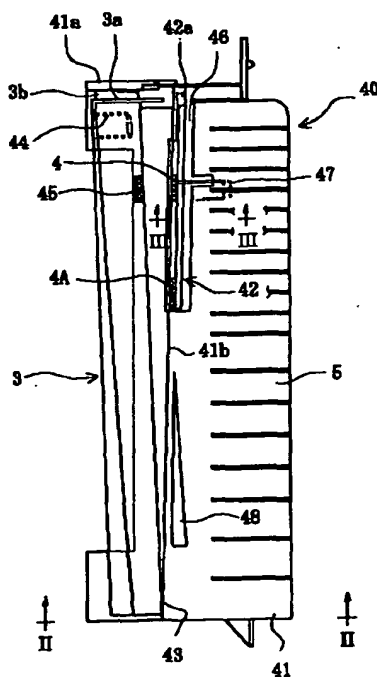
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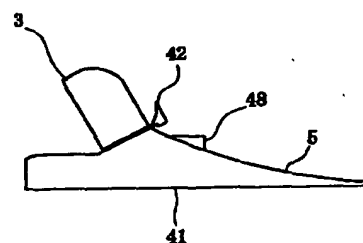
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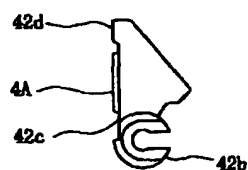
【図4】



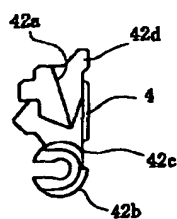
【図5】



【図9】



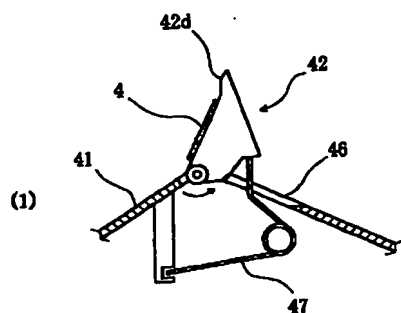
【図8】



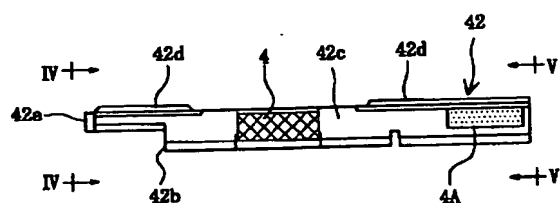
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【図 6】



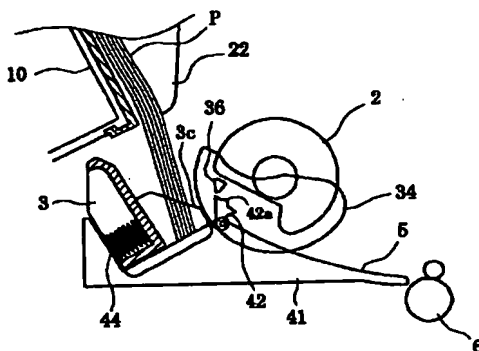
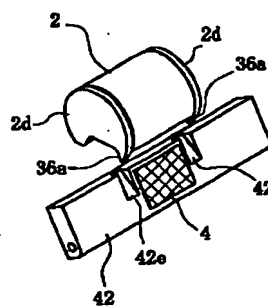
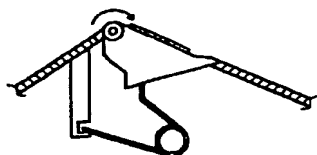
【図 7】



【図 11】

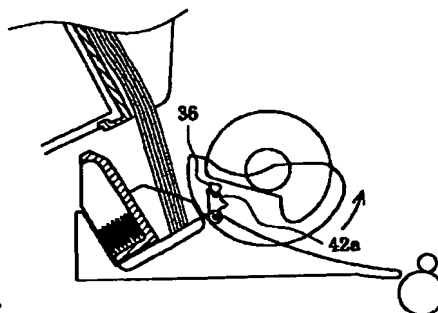
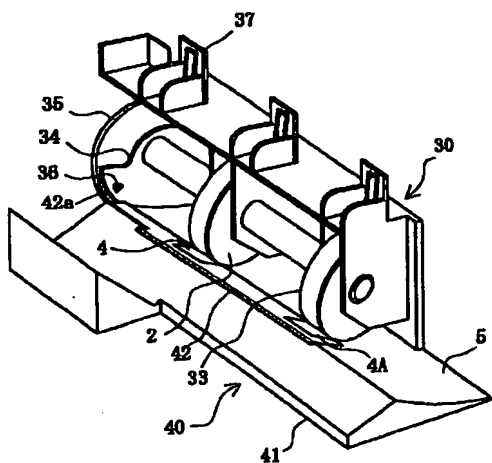
【図 12】

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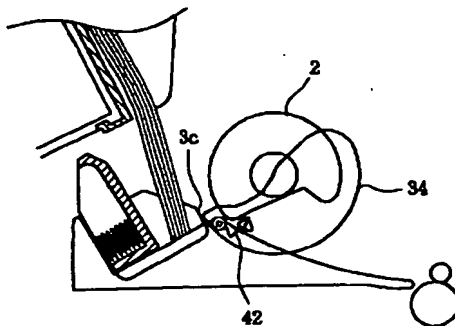


【図 10】

【図 13】



【図 14】

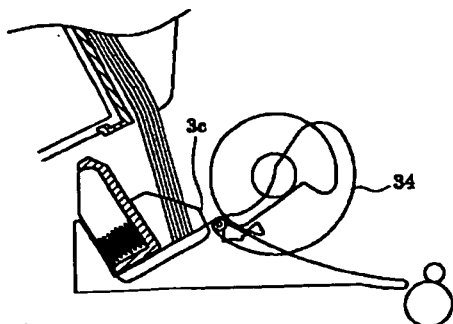




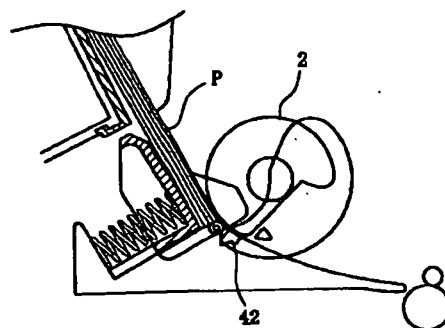
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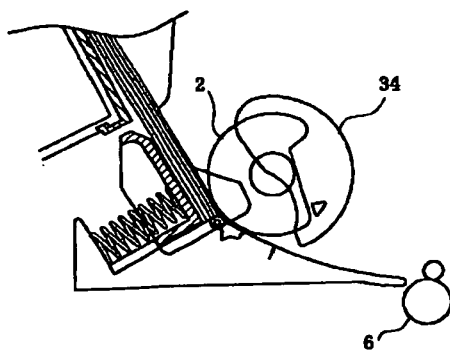
【図15】



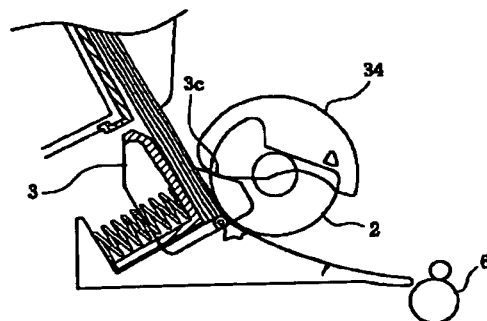
【図16】



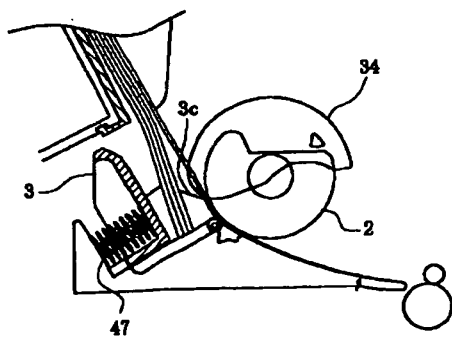
【図17】



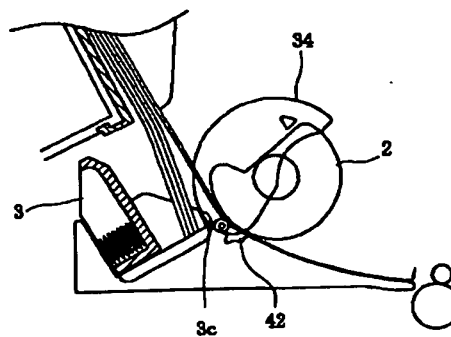
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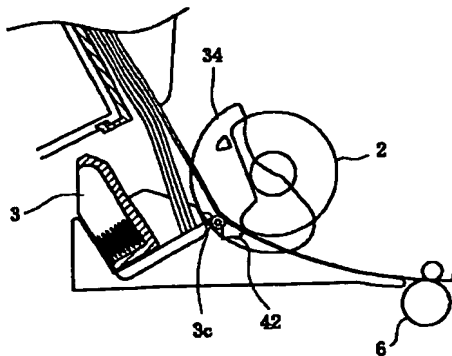
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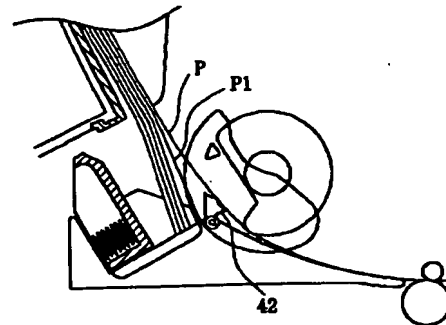
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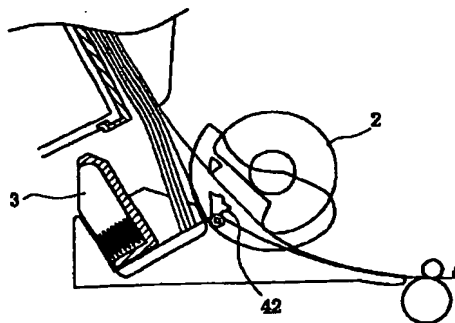
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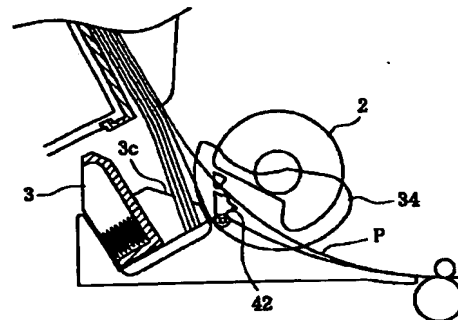
【図22】



【図23】



【図24】



フロントページの続き

Fターム(参考) 3F343 FA02 FB04 FC06 FC17 GA04  
GB01 GC01 GD01 HD17 JA03  
JD08 JD33 JD35 KB05 LA04  
LA15

**Paper feeder**

Patent Number: ☐ EP1160185  
Publication date: 2001-12-05  
Inventor(s): FURUYAMA MASAFUMI (JP); OTSUKA KAZUO (JP)  
Applicant(s): SEIKO EPSON CORP (JP)  
Requested Patent: ☐ JP2001341876  
Application Number: EP20010112869 20010531  
Priority Number(s): JP20000161447 20000531  
IPC Classification: B65H3/06; B65H3/52  
EC Classification: B65H3/52, B65H3/06L  
Equivalents: ☐ US2002011702  
Cited Documents:

**Abstract**

A paper returner (42) is placed in the vicinity of an end portion of a hopper (3) for stacking a plurality of sheets of paper (P) which faces a paper feeding roller (2), so as to be pivotable between a first position where the paper returner constitutes a part of the paper transporting passage, and a second position where the paper returner is isolated from the paper transporting passage. A separation pad (4) is provided on a first face of the paper returner. The separation pad has a friction coefficient which is higher than a friction coefficient of the first face of the paper returner. The paper returner is placed at the first position so that a top sheet of paper in the hopper is abutted against the paper feeding roller, and is separated from other sheets of paper by the separation pad. The paper returner is placed at the second position so that the first face of the paper returner returns sheets of paper, which are entered in

the paper transporting passage together with the sheet of paper to be fed, to the hopper. 

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3. In the drawings, any words are not translated.

**CLAIMS**

**[Claim(s)]**

[Claim 1] The hopper which loads two or more sheets of forms in the feed equipment which feeds with a form with a feed roller, While having the field in which the separation pad and the aforementioned separation pad of high friction material were attached, pushing the form of the most significant of the aforementioned hopper against a feed roller and dissociating It has the paper return member which returns the form \*\*\*\*(ed) by the aforementioned field to the aforementioned hopper. the aforementioned paper return member Have the end face prolonged in the side of a hopper, and this end face is located near the front end of a hopper. While being prepared in the lodging position which feeds with a form by having two incomes with a feed roller by using this end face as the supporting point, and the standing-up position which does not interfere in this feed roller possible [ rotation ] Feed equipment characterized by returning to a hopper the form which turns a paper return member to a standing-up position from the aforementioned lodging position, was made to rotate it when a feed roller changed into the state where it does not feed with a form, and was \*\*\*\*(ed).

[Claim 2] a claim 1 -- setting -- the central approach of a feed roller to the cross direction -- an auxiliary roller -- having -- the time of feeding -- paper return -- the feed equipment characterized by feeding by pushing a form against the aforementioned auxiliary roller in respect of a member

[Claim 3] a claim 1 or 2 -- setting -- paper return -- the feed equipment characterized by the standing-up position of a member being a position which prevents the penetration to the form conveyance way of the form which interrupted the form conveyance way and was loaded into the hopper

[Claim 4] Feed equipment characterized by having an energization means to act so that a paper return member may be rotated to a feed roller side and a separation pad may be pushed against a feed roller, resisting the energization force of the aforementioned energization means and rotating a paper return member to a lodging position according to the rotation forcing force of this feed roller in a claim 1.

[Claim 5] Feed equipment characterized by for a feed roller to act on a direct paper return member, and to make it rotate to a lodging position after having a tilting means interlock a paper return member with the rotation to the feed direction of a feed roller, and rotate a predetermined angle towards a lodging position in a claim 4 from a standing-up position and carrying out predetermined angle rotation of the aforementioned paper return member.

[Claim 6] It is feed equipment characterized by arranging the tilting means in a claim 5 on the outside of the cross direction of a form conveyance way.

[Claim 7] the side edge which, as for the tilting means, the cam mechanism was used, and the paper return member projected outside the field of a form conveyance way, and was formed in the claim 6 -- having -- the aforementioned cam mechanism -- paper return -- the feed equipment characterized by consisting of a cam follower prepared in the side edge of a member, and a cam which acts on the aforementioned cam follower with rotation of a feed roller

[Claim 8] It is feed equipment which is equipped with the cam mechanism for the hopper upper and lower sides which goes up or drops the aforementioned hopper by feed operation, and is characterized by the elevation timing of the aforementioned hopper being after a paper return member arrives at a

lodging position while supporting a hopper possible [ elevation or descent ] in a claim 1.

[Claim 9] a claim 1 -- setting -- paper return -- the feed equipment characterized by the rotation timing from a lodging position to the standing-up position of a member being after dropping a hopper

[Claim 10] It is feed equipment with which it is characterized by preparing the side by which the feed roller has been arranged for this supporting point in the opposite side by considering as the structure where a hopper makes the supporting point rotate a crosswise end side in a claim 8 or 9.

[Claim 11] A hopper is feed equipment characterized by going up or descending where an inclination with a fixed hopper side is maintained to a feed roller in a claim 10.

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[Translation done.]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the feed equipment which gave the function which separates and feeds with one sheet of form at a time the paper return member which returns to a hopper the form which was used for recording devices, such as a printer, and was applied to the feed equipment which feeds with the sheet-like form loaded into the hopper, especially was \*\*\*\* (ed).

[0002]

[Description of the Prior Art] The feed equipment used for a recording device arranges two feed rollers crosswise [ of a form ], and one feed roller is placed in a fixed position at one side edge side, and another side is included in an edge guide and arranged semipermanent [ which can move ] according to form width of face. It is constituted so that the cam mechanism which the end face of a hopper was attached in the right-angled shaft possible [ rotation ] to the penetration direction of a form, and was interlocked with rotation of a feed roller may perform the whole cross direction of a form and the same operation may perform elevation or descent. In order for one sheet to dissociate at a time from a hopper and to feed, the separation pad electrode holder which prepared the separation pad is attached possible [ rotation ].

[0003] If a form is made to contact a feed roller by elevation of a hopper and a separation pad is simultaneously pushed against a feed roller, the separation feed of the form of the most significant will be carried out. After a form reaches a conveyance roller and skew \*\*\*\* is completed, a feed roller rotates at a home position and stops at it. In the meantime, search operation which makes regularity distance of a form nose of cam and a recording head is performed, and printing is started after that. Although a crevice is formed between a feed roller and a separation pad where the aforementioned feed roller is suspended at a home position, some forms under printing exist. A form while also printing the form sent by the form \*\*\*\*(ed) at this time entering a crevice, and lapping two or more depending on the case \*\*\*\*\*, and it may be fed. As a cure of such fault, the idle roller is always pressed against the separation pad. When there is a form under printing between a feed roller and a separation pad, penetration of the form which \*\*\*\*(ed) is prevented by pressing this form against a separation pad by the idle roller. The form which had penetration prevented operates a paper return lever after a printing end, and is put back to a hopper.

[0004]

[Problem(s) to be Solved by the Invention] With conventional feed equipment, since the separation pad electrode holder and the paper return lever were constituted separately, structure became complicated, and there were also many part mark and they caused cost quantity. Moreover, since the next feed operation cannot be made to start since paper return operation was performed after printing unless it is after a paper return end, the time (throughput) from the printing end of a front form to the printing start of the following form becomes long. Furthermore, since the form under printing was pressed against the idle roller, the contact load with a form arose and it had problems, such as becoming the load of a

motorised system. The purpose of this invention is to offer the feed equipment which gave the function which separates and feeds a paper return member with one sheet of form at a time. Moreover, other purposes of this invention are to offer the feed equipment which enabled it to perform paper return operation during printing.

[0005]

[Means for Solving the Problem] In the feed equipment which invention of a claim 1 feeds with a form with a feed roller While having the field in which the hopper loading two or more sheets of forms, the separation pad of high friction material, and the separation pad were attached, pushing the form of the most significant of a hopper against a feed roller and dissociating It has the paper return member which returns the form \*\*\*\*(ed) by the aforementioned field to the aforementioned hopper. a paper return member Have the end face prolonged in the side of a hopper, and this end face is located near the front end of a hopper. While being prepared in the lodging position which feeds with a form by having two incomes with a feed roller by using this end face as the supporting point, and the standing-up position which does not interfere in this feed roller possible [ rotation ] When a feed roller changes into the state where it does not feed with a form, a paper return member is turned to a standing-up position from a lodging position, and is rotated, and it is characterized by returning the \*\*\*\*(ed) form to a hopper. According to invention of a claim 1, since the separation pad was attached in the paper return member, part mark can be reduced compared with the case where a separation pad electrode holder and a paper return lever are separately constituted like before, and cost reduction can be planned by simplification of structure.

[0006] invention of a claim 2 -- a claim 1 -- setting -- the central approach of a feed roller to the cross direction -- an auxiliary roller -- having -- the time of feeding -- paper return -- it is characterized by feeding by pushing a form against an auxiliary roller in respect of a member According to invention of a claim 2, by having formed the auxiliary roller in crosswise central approach from the feed roller, the movement of the other end of a form without the entrainment penetration with a feed roller is stopped, a skew can be made hard to start and generating of the paper jam by the skew can be prevented.

[0007] invention of a claim 3 -- a claim 1 or 2 -- setting -- paper return -- the standing-up position of a member is characterized by being the position which prevents the penetration to the form conveyance way of the form which interrupted the form conveyance way and was loaded into the hopper According to invention of a claim 3, by making the paper return member stand up at the time of un-feeding paper, the nose of cam of a form is regulated and it can prevent advancing carelessly to a form conveyance way.

[0008] In a claim 1, invention of a claim 4 rotates a paper return member to a feed roller side, is equipped with an energization means to act so that a separation pad may be pushed against a feed roller, and is characterized by resisting the energization force of an energization means and rotating a paper return member to a lodging position according to the rotation forcing force of this feed roller. according to invention of a claim 4 -- paper return -- since rotation to the lodging position of a member is performed by the rotation forcing force of a feed roller, a paper return member always contacts to a feed roller -- having -- paper return -- pressing down of the form of a member becomes certain

[0009] In a claim 4, after invention of a claim 5 is equipped with a tilting means interlock a paper return member with the rotation to the feed direction of a feed roller, and rotate a predetermined angle towards a lodging position from a standing-up position and carries out predetermined angle rotation of the aforementioned paper return member, it is characterized by for a feed roller to act on a direct paper return member, and to make it rotate to a lodging position. according to invention of a claim 5 -- paper return in a lodging position -- the form conveyance way from a hopper to a feed roller is mostly closed by the paper return member, and rotation of a member can prevent penetration of an unprepared form while being able to rotate a paper return member smoothly [ it is reasonable and ], since initial rotation by the tilting means and this rotation by the rotation forcing force of a feed roller are performed continuously

[0010] Invention of a claim 6 is characterized by arranging the tilting means on the outside of the cross direction of a form conveyance way in a claim 5. according to invention of a claim 6 -- paper return -- a



damage is not given to the aforementioned form, even if a tilting means operates, after the form of a paper jam has been on a member

[0011] the side edge which, as for the tilting means, the cam mechanism was used in the claim 6, as for invention of a claim 7, and the paper return member projected outside the field of a form conveyance way, and was formed -- having -- a cam mechanism -- paper return -- it is characterized by consisting of a cam follower prepared in the side edge of a member, and a cam which acts on a cam follower with rotation of a feed roller According to invention of a claim 7, structure is simplified by making a tilting means into a cam mechanism.

[0012] While invention of a claim 8 supports a hopper possible [ elevation or descent ] in a claim 1, it has the cam mechanism for the hopper upper and lower sides which goes up or drops a hopper by feed operation, and is characterized by the elevation timing of a hopper being, after a paper return member arrives at a lodging position. although there is a possibility that a form nose of cam may break by the paper return member when according to invention of a claim 8 a hopper goes up [ a paper return member ] to a standing-up state or a lodging position in the middle of other and the plug of a form is started -- the elevation timing of a hopper -- paper return -- the aforementioned fault can be certainly prevented by carrying out, after reaching to the lodging position of a member

[0013] invention of a claim 9 -- a claim 1 -- setting -- paper return -- after the rotation timing from a lodging position to the standing-up position of a member drops a hopper, it is characterized by being the paper return which operates after the completion of a feed of the form of the most significant according to invention of a claim 9 -- the form \*\*\*\*(ed) by the standing-up return of a member can be certainly returned in a hopper A throughput improves by performing this operation during feeding. Moreover, during printing, since a paper return member is in a standing-up position, the idle roller which prevents that an excessive form advances into a form conveyance way like before becomes unnecessary, and the contact load between a paper return member and a feed roller can be reduced.

[0014] Invention of a claim 10 makes a hopper the structure of making the supporting point rotating a crosswise end side, in a claim 8 or 9, and it is characterized by preparing this supporting point in the opposite side with the side by which the feed roller has been arranged. According to invention of a claim 10, the rotation supporting point of a hopper can cut down part mark according to the structure which attaches and detaches on one feed roller while being able to narrow the dip of a hopper and being able to attain the miniaturization of a hopper since it is prepared in the opposite side with the side by which the feed roller has been arranged.

[0015] Invention of a claim 11 is characterized by a hopper going up or descending, after the hopper side has maintained the fixed inclination to a feed roller in a claim 10. According to invention of a claim 11, in elevation or downward operation of a hopper, feeding in which the degree of angle of approach to a separation pad did not change, and was stabilized by the field of a hopper even if it changed form number of sheets, since the fixed inclination was maintained to the feed roller is performed.

[0016]

[Embodiments of the Invention] The gestalt of operation of the invention in this application is explained. Drawing 1 is the cross-sectional view of the recording device which applied the feed equipment concerning this invention. It detaches by \*\*. two or more sheets of forms P with which the recording device 1 was loaded into the hopper 3 by rotation of the feed roller 2 -- the separation pad 4 -- the feed roller 2 -- pushing -- an one-sheet \*\* -- The paper guide 5 is made to meet and the conveyance roller 6 is fed, after carrying out skew \*\*\*\*, according to printing timing, it sends to a record section, and after printing with reciprocating movement of the direction of vertical scanning of carriage 8 in which the recording head 7 was carried, it discharges with the eccrisis roller 9.

[0017] The paper support 21 is attached in the housing 10 of a recording device 1, and the edge guide 22 for regulating the side edge of the form P supported to this paper support 21 is formed in housing 10 possible [ sliding ]. Between the edge guide 22 and the feed roller 2, the hopper 3 is formed possible [ rotation ], and when raising this hopper 3, the separation pad 4 pushes the form of the most significant against the feed roller 2, and dissociates and feeds.

[0018] the unit (A) which feed equipment 20 incorporated the feed roller 2, the auxiliary roller 33, the

roller drive gear 35, etc., and was unified -- 30 -- The unit (B) 40 which included the member 42 in the frame 41 and was unified is included. the paper return which has a hopper 3 and the separation putt 4 -- A unit (A) 30 is fixed to the tooth back of the frame 13 into which carriage 10 is divided, and the unit (B) 40 is attached in the mainframe 12 so that the skirt portion of the frame 41 of cross-section Yamagata may come on the abbreviation extension wire of the form conveyance path of tying the conveyance roller 6 and the eccrisis roller 9. While reducing the number of assemblers to a recording device by these unit-ization, adjustment of the unit after attachment can be lessened.

[0019] A unit (A) and a unit (B) are explained in more detail. paper return [ according / drawing 2 / drawing 3 / the plan of a unit (A), and ] to the III-III cross section of drawing 4 in the side elevation of the I-I view of drawing 2 , and drawing 4 / according / the plan of a unit (B) and drawing 5 / to the side elevation of the II-II view of drawing 4 -- explanatory drawing and drawing 7 which show the operation of a member -- paper return -- the plan of a member and drawing 8 are the perspective diagrams at the time of attachment of a unit (A) and an

[0020] In drawing 2 , a unit (A) 30 is supported possible [ rotation of the roller shaft 32 ] to bearing 31a of the roller electrode holder 31, and the feed roller 2 and the auxiliary roller 33 are formed in this roller shaft 32, respectively. The cam 34 for the hopper upper and lower sides which constitutes the hopper cam mechanism which operates elevation or descent of a hopper 3, and the transfer gear 35 for carrying out a rotation drive are formed in the roller shaft 32. paper return of the after-mentioned [ side / of the cam 34 for the hopper upper and lower sides ] -- the small cam 36 which performs initial devotion operation in lodging operation of a member 42 is formed The transfer gear 35 is coordinated with the drive gear of the feed motor which omitted illustration through the middle transfer gear.

[0021] The feed roller 2 consists of radii partial 2a and flat part part 2c, as shown in drawing 3 , and friction material is attached in order to feed radii partial 2a with a form. Radii partial 2a gives radii partial 2b which protruded in flat part part 2c, and enlarges the whole radii length. Even if the form burden of a hopper 3 changes, radii partial 2b acts so that even the conveyance roller 6 may feed with a form certainly. When there is one sheet of form in a hopper 3, a hopper 3 is raised from a minimum position and time until it makes a form contact to the feed roller 2 becomes the longest. That is, since the feed roller 2 carries out predetermined angle rotation before contact of a form, the length of radii partial 2b is set up so that it may reach to the conveyance roller 6 by the feed from the contact position of a form. Thus, by preparing radii partial 2b which protruded in the flat part part 2c side of the feed roller 2, without making the feed roller 2 into a major diameter, the whole radii partial 2a can be lengthened and the miniaturization of equipment can be attained.

[0022] When feeding with the form contained by the hopper 3 with one feed roller 2 arranged at the one side of the cross direction, it is involved in the one side of a form by the feed roller 2, and a form flank curls and advances. In order that there may be no feed roller 2 in a side besides a form, it advances in the straight state. Thus, in the cross direction of a form, if form conveyance is performed based on different penetration, a skew will happen and it will become easy to generate a paper jam. In order to cancel the above-mentioned fault by the method which has arranged the feed roller 2 only in one side of the cross direction of a form, the auxiliary roller 33 is arranged by the central approach of the cross direction separated from the feed roller 2.

[0023] the auxiliary roller 33 is arranged on the feed roller 2 and the same axle -- having -- a form -- paper return -- it pushes by auxiliary pad 4A of a member 42, and functions as involving in the central approach of the cross direction of a form like a feed roller the movement of the other end of a form stops by having the auxiliary roller 33 -- having -- a skew -- starting -- hard -- \*\* -- \*\* A sign 37 is the flat cable stop section (refer to drawing 1 ) prepared in the frame 31, in order to hold the flat cable 38 which transmits a printing signal to a recording head 7.

[0024] while a unit (B) 40 makes the forward slope side of the frame 41 of cross-section Yamagata prolonged crosswise [ of a recording device 1 ] the paper guide 5 and the hopper 3 is arranged in the back inclined plane -- the summit of a frame 41 -- ridgeline partial 41b -- meeting -- paper return -- a member 42 is arranged and the end face is prepared in ridgeline partial 41b possible [ rotation ] The hopper 3 is attached possible [ rotation ] along the inclined plane of a frame 41 by using the end of the

cross direction of a recording device 1 as the supporting point 43, the other end is located in a unit (A) 30 side, hopper edge guide 3a is prepared, and the upper-limit side forms hopper cam-follower 3c on which the cam 34 for the hopper upper and lower sides acts. It was inserted in hopper guide 41a which was prolonged from hopper edge guide 3a to the method of outside and by which it projects, partial 3b is formed and this lobe part 3b was set up from the frame 41, and the movement of the other end of a hopper 3 is regulated only in elevation or the downward direction.

[0025] The hopper side of the near is established so that it may be mostly in agreement with ridgeline partial 41b, and the rotation supporting point 43 of a hopper 3 has prevented that a form nose of cam is caught in the frame 41 by the side of the rotation supporting point 43 of a hopper 3 at the time of a form set. Moreover, the hopper spring 44 is infixed in the near tooth back of the other end of a hopper 3 between frames 41, and the hopper 3 is energized in the direction of the top of an inclined plane. The sheet 45 of high friction material is stuck on the field of a hopper 3 according to the position of the separation pad 4.

[0026] paper return -- the member 42 is attached possible [ rotation ] by inserting in the shank of a frame 41 end face 42b formed in bearing structure paper return -- in surface 42c of a member 42, it has the separation pad 4 and auxiliary pad 4A which have been estranged and arranged the edge guide 3a side of a hopper 3 -- paper return -- cam-follower 42a for performing initial devotion of a member 42 is prepared, and the small cam 36 prepared in the side of the cam 34 for the hopper upper and lower sides acts on this cam-follower 42a here -- the small cam 36 and cam-follower 42a -- paper return -- a tilting means to interlock a member 42 with the rotation to the feed direction of the feed roller 2, and to rotate a predetermined angle towards a lodging position from a standing-up position is constituted

[0027] With end face 42b, 42d of bank sections slightly prolonged in the slanting upper part from surface 42c at the portion excluding [ the free end of an opposite side ] the width of face of the separation pad 4 is formed, and they act so that 42d of this bank section may catch a form nose of cam certainly and it may put it back to a hopper 3 at the time of paper return. the paper guide 5 -- paper return -- a member 42 and abbreviation -- the isomorphous notch 46 forms -- having -- \*\*\*\* -- this notch 46 -- paper return -- a member 42 -- the paper return from a standing-up state (state of drawing 6 (1)) -- a member -- it is covered, when the energization force of the \*\* spring 47 is resisted and it rotated and lodges (state of drawing 6 (2)), and it becomes flat-tapped at the paper guide 5 paper return -- a member -- the \*\* spring 47 consists of coil springs, and is arranged in the background of a frame 41 paper return -- a member -- the end of the \*\* spring 47 -- paper return -- the other end stops on a frame 41 to the rear face of a member 42, respectively -- having -- paper return -- it is energizing so that a member 42 may be made to stand up (state of drawing 5)

[0028] paper return -- standing up of a member 42 has started to the perpendicular mostly, and prevents that the form at the time of a set advances into a form conveyance way carelessly this standing-up state - - the outside of rotation tracing of the roller side of the feed roller 2 -- paper return -- there is a member 42 and the rotation force cannot be given then, paper return -- in order to put in the portion which makes the rotation force act on a member 42 in rotation tracing of the roller side of the feed roller 2 -- the rotation early stages of the feed roller 2 of feed operation -- setting -- the small cam 36 and cam-follower 42a -- rotation of the feed roller 2 -- interlocking -- paper return -- a member 42 is rotated in early stages of a predetermined angle then, the rotation forcing force of the feed roller 2 -- paper return -- direct action is carried out to a member 42, and it is made to rotate thereby -- paper return -- a member 42 can be rotated smoothly [ it is reasonable and ] The form receptacle section 48 is formed on the paper guide 5 near ridgeline partial 41b, this form receptacle section 48 has the broad rotation supporting-point 43 side of a hopper 3, it has the upper \*\*\*\*\* flat surface which becomes narrow toward a center, and collapse of cargo piles of the form which this loaded is prevented at the rotation supporting-point side of a hopper 3.

[0029] Drawing 11 is the perspective diagram showing other examples of a tilting means to perform initial rotation at the time of making a paper return member lodge. the method of both sides of the separation pad 4 -- paper return -- grooved cam 42e is formed towards the free end of a member 42 flange 2d of the both sides of the feed roller 2 -- paper return -- small cam 36a which acts on grooved

cam 42e of a member 42 is prepared the roller side of the feed roller 2 -- paper return -- contacting the separation pad 4 of a member 42 -- preceding -- small cam 36a -- grooved cam 42a -- acting -- paper return -- a member 42 is rotated in early stages of a predetermined angle the paper return which can be set after that -- lodging operation of a member 42 is the same as that of the aforementioned example [0030] Next, feed operation is explained. Drawing 12 - drawing 24 are explanatory drawings showing the flow of feed operation. Two or more sheets of forms P are set to the paper support 21. a part for the flat part of the feed roller 2 at a home position -- the field of the paper guide 5 of a frame 41 -- almost -- parallel -- paper return -- the member 42 is in the state where stand up and it does not interfere between the feed rollers 2 paper return -- it is in the position which interrupts the form conveyance way between the feed roller 2 and a hopper 3, and it is regulating the nose of cam of a form at the time of a form set at the time of standing up of a member 42, and it has the work which prevents penetration \*\*\*\* in the form conveyance way On the other hand, the hopper 3 is depressed by the cam 34 for the hopper upper and lower sides in the minimum position (state of drawing 12 ). if the feed roller 2 rotates by feed start -- first -- the small cam 36 -- paper return -- cam-follower 42a of a member 42 -- acting -- paper return -- a member 42 is leaned slightly and initial operation of lodging is performed (state of drawing 13 ) paper return -- a member 42 -- after predetermined \*\*\*\*\* -- the feed roller 2 -- paper return -- the front face of a member 42 -- hitting -- the rotation forcing force at that time -- paper return -- a member - - energization of the \*\* spring 47 -- resisting -- paper return -- a member 42 is turned to a lodging position and it is made to rotate In the meantime, the cam 34 for the hopper upper and lower sides acts on hopper cam-follower 3c, and a hopper 3 is maintained in a minimum position (state of drawing 14 ). paper return -- a member 42 arrives at a lodging position (state of drawing 15 ), maintenance of the minimum position of the hopper 3 by the cam 34 for the hopper upper and lower sides is solved after that, with the hopper spring 44, a hopper 3 goes up and the form of the most significant is pushed against the feed roller 2 (state of drawing 16 ) Feed of the form of the most significant starts by rotation of the feed roller 2 (state of drawing 17 ). In addition, a upward arrow shows the position at the nose of cam of a form among drawing. Before a form nose of cam reaches the conveyance roller 6, the cam 34 for the hopper upper and lower sides acts on hopper cam-follower 3c, and starts descent from the position in front of the descent which shows a hopper 3 to drawing 18 ( drawing 19 is a state in the middle of downward). a hopper 3 -- a minimum position -- reaching ( drawing 20 ) -- after that -- paper return -- standing-up operation of a member 42 -- paper return -- a member -- it starts by the spring force of the \*\* spring 47 (drawing 21 is a state in front of standing up) A form nose of cam reaches the conveyance roller 6 in the meantime, and skew \*\*\*\* and search operation are performed. [0031] then, paper return -- a member -- the spring force of the \*\* spring 47 -- paper return -- standing up of a member 42 is completed under the rotation for [ this ] standing up -- previous operation -- setting -- the form P of the most significant -- \*\*\*\*\* (ing) -- the feed roller 2 and paper return -- the nose of cam of the form P1 of \*\*\*\* which entered by the wedge effect between members 42 is caught, and paper return pushed and held in a hopper 3 is performed (for drawing 22 , drawing 23 is a state in the middle of the rotation to home HOJISHON of the feed roller 2 after paper return completion at the time of paper return completion) While the feed roller 2 returns to home HOJISHON, printing starts to Form P (state of drawing 24 ).

[0032]

[Effect of the Invention] According to this invention, since the separation pad was attached in the paper return member, part mark can be reduced compared with the case where a separation pad electrode holder and a paper return lever are separately constituted like before, and cost reduction can be planned by simplification of structure. Moreover, it can prevent that a form advances carelessly to a form conveyance way by making the paper return member stand up at the time of un-feeding paper.

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[Translation done.]

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3. In the drawings, any words are not translated.

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PRIOR ART

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[Description of the Prior Art] The feed equipment used for a recording device arranges two feed rollers crosswise [ of a form ], and one feed roller is placed in a fixed position at one side edge side, and another side is included in an edge guide and arranged semipermanent [ which can move ] according to form width of face. It is constituted so that the cam mechanism which the end face of a hopper was attached in the right-angled shaft possible [ rotation ] to the penetration direction of a form, and was interlocked with rotation of a feed roller may perform the whole cross direction of a form and the same operation may perform a rise or descent. In order for one sheet to dissociate at a time from a hopper and to feed, the separation pad electrode holder which prepared the separation pad is attached possible [ rotation ].

[0003] If a form is made to contact a feed roller by rise of a hopper and a separation pad is simultaneously pushed against a feed roller, the separation feed of the form of the most significant will be carried out. After a form reaches a conveyance roller and skew \*\*\*\* is completed, a feed roller rotates at a home position and stops at it. In the meantime, search operation which makes regularity distance of a form nose of cam and a recording head is performed, and printing is started after that. Although a crevice is formed between a feed roller and a separation pad where the aforementioned feed roller is suspended at a home position, some forms under printing exist. A form while also printing the form sent by the form \*\*\*\*(ed) at this time entering a crevice, and lapping two or more depending on the case \*\*\*\*\*, and it may be fed. As a cure of such fault, the idle roller is always pressed against the separation pad. When there is a form under printing between a feed roller and a separation pad, penetration of the form which \*\*\*\*(ed) is prevented by pressing this form against a separation pad by the idle roller. The form which had penetration prevented operates a paper return lever after a printing end, and is put back to a hopper.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-sectional view of the recording device which applied the feed equipment concerning this invention.

[Drawing 2] It is the plan of a unit (A).

[Drawing 3] It is the side elevation of the I-I view of drawing 2 .

[Drawing 4] It is the plan of a unit (B).

[Drawing 5] It is the side elevation of the II-II view of drawing 4 .

[Drawing 6] the paper return by the III-III cross section of drawing 4 -- it is explanatory drawing showing the operation of a member

[Drawing 7] paper return -- it is the plan of a member

[Drawing 8] It is the side elevation of the IV-IV view of drawing 7 .

[Drawing 9] It is the side elevation of the V-V view of drawing 7 .

[Drawing 10] It is a perspective diagram at the time of attachment of a unit (A) and a unit (B).

[Drawing 11] It is the perspective diagram showing other examples of a tilting means to perform initial rotation at the time of making a paper return member lodge.

[Drawing 12] a hopper in case a feed roller is a home position, and paper return -- it is drawing showing the relation of a member

[Drawing 13] It is drawing in which pushing down a paper return member on by the small cam, and showing the start.

[Drawing 14] A feed roller is drawing showing the state where the separation pad was contacted.

[Drawing 15] paper return -- it is drawing showing the lodging position of a member

[Drawing 16] It is drawing in which it is shown immediately after a hopper goes up.

[Drawing 17] It is drawing showing under feeding.

[Drawing 18] It is drawing in which it is shown just before a hopper begins descent.

[Drawing 19] It is drawing showing the downward middle of a hopper.

[Drawing 20] A hopper is drawing showing the state where the minimum was reached.

[Drawing 21] It is drawing in which it is shown just before a paper return member starts standing-up operation.

[Drawing 22] A paper return member is drawing in which arriving at a standing-up position and showing paper return completion.

[Drawing 23] It is drawing showing rotation of the feed roller after paper return completion.

[Drawing 24] A feed roller is drawing showing the state where it returned to the home position.

[Description of Notations]

- 1 Recording Device
- 2 Feed Roller
- 3 Hopper
- 3c Hopper cam follower
- 4 Separation Pad

5 Paper Guide  
6 Conveyance Roller  
7 Recording Head  
8 Carriage  
9 Eccrisis Roller  
10 Housing  
12 Mainframe  
20 Feed Equipment  
21 Paper Support  
22 Edge Guide  
30 Unit (A)  
33 Auxiliary Roller  
34 Hopper Cam  
36 36a Smallness cam  
40 Unit (B)  
42 Paper Return -- Member  
42a Cam follower  
42e Grooved cam  
48 Form Receptacle Section

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[Translation done.]

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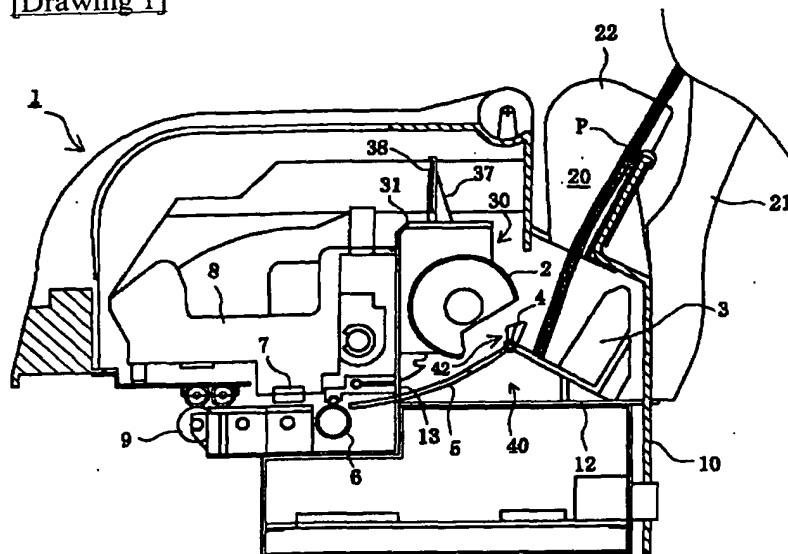
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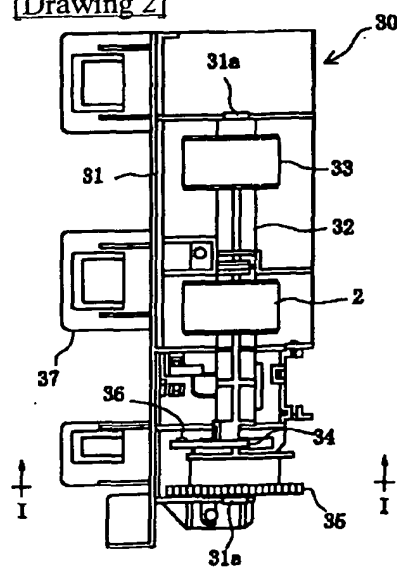
DRAWINGS

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[Drawing 1]

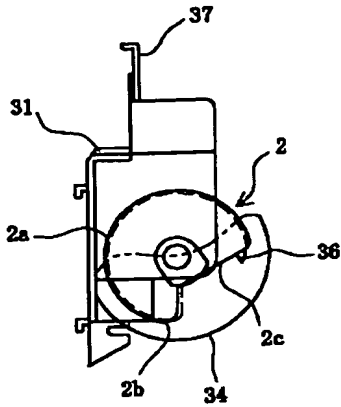


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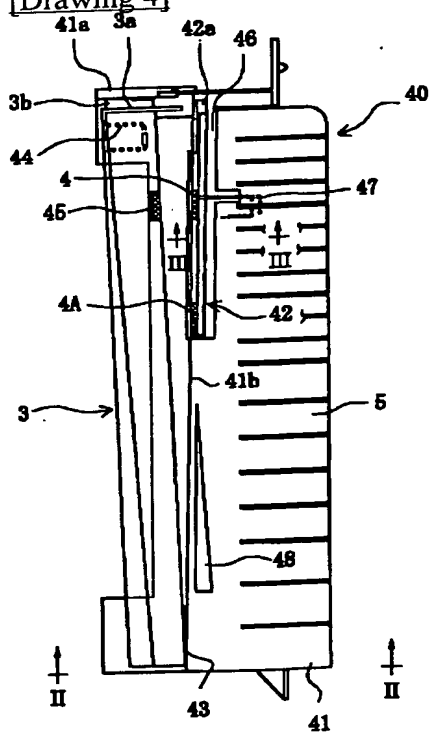




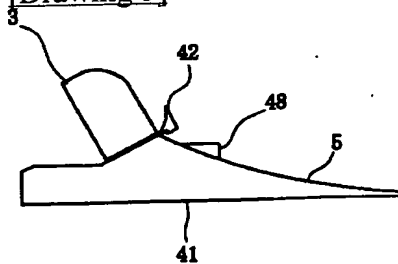
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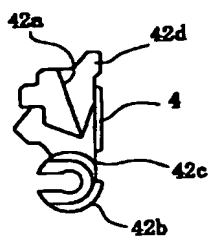
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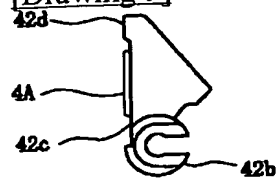
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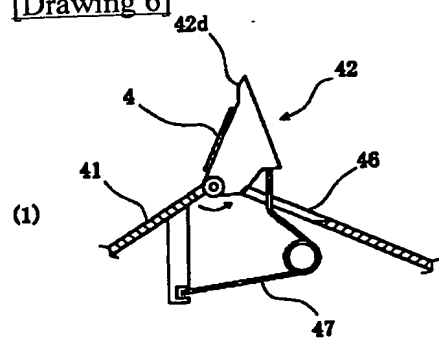
[Drawing 8]



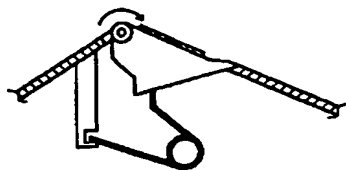
[Drawing 9]



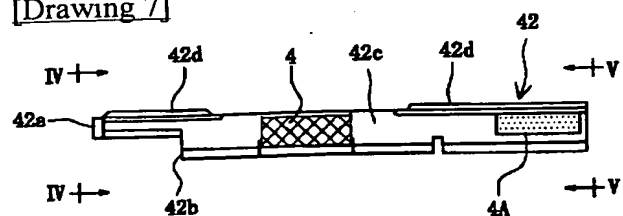
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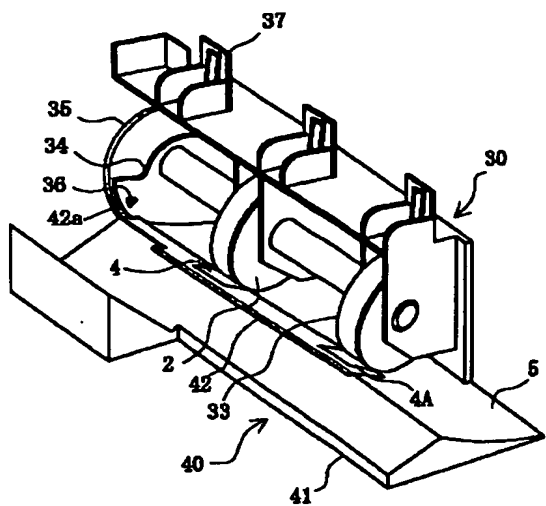
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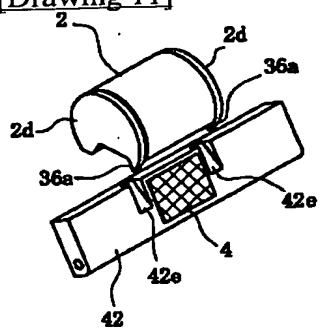
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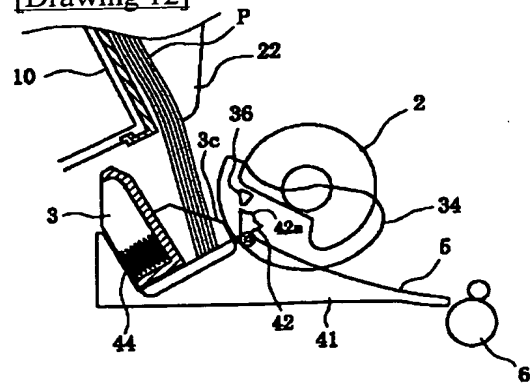
[Drawing 10]



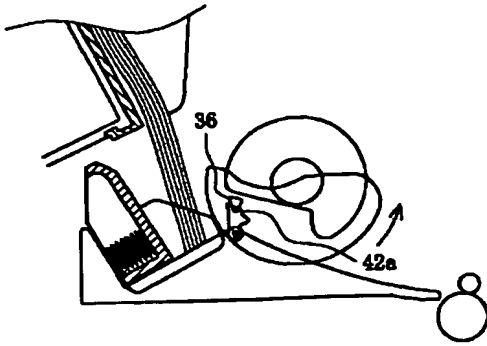
[Drawing 11]



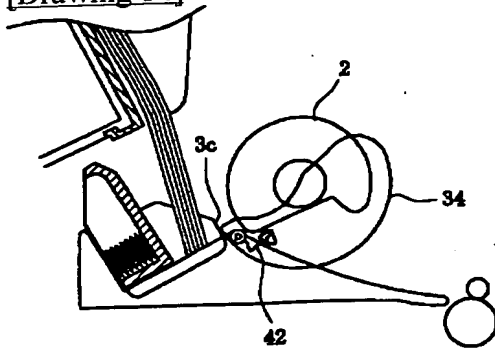
[Drawing 12]



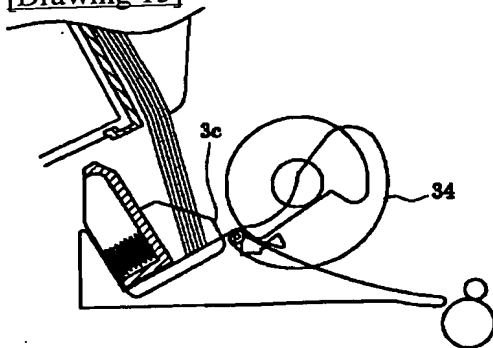
[Drawing 13]



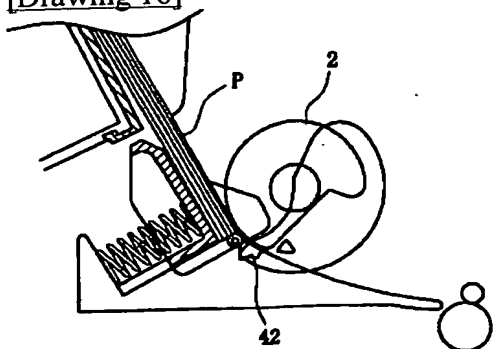
[Drawing 14]



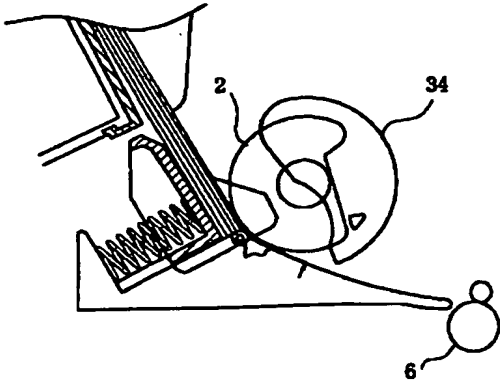
[Drawing 15]



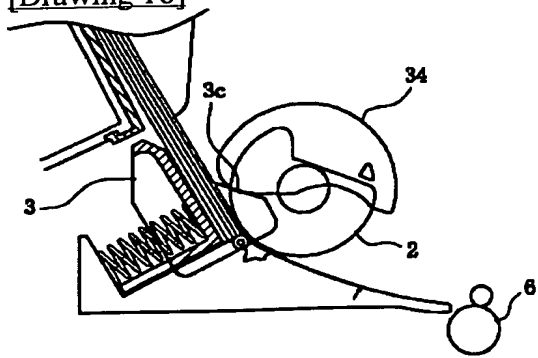
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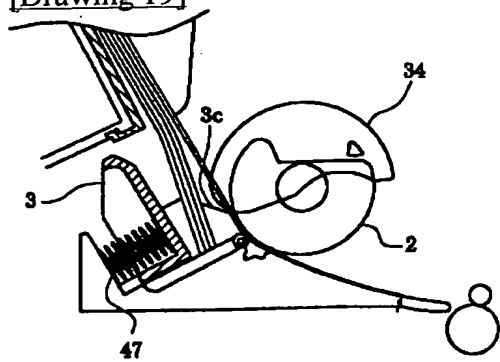
[Drawing 17]



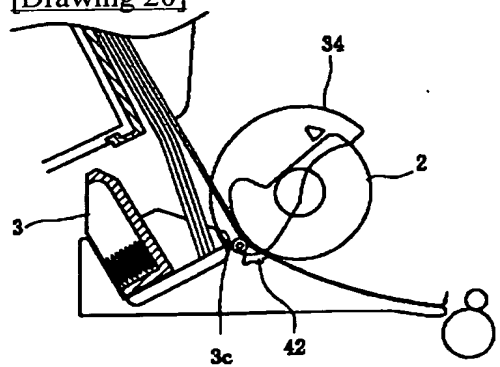
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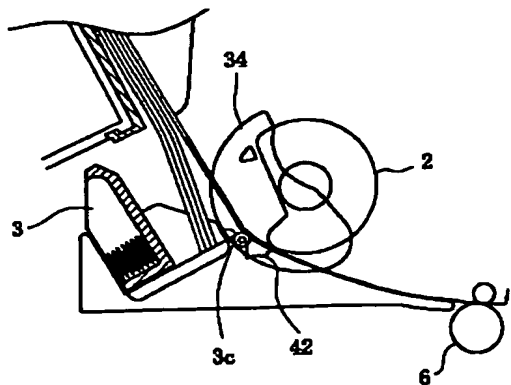
[Drawing 19]



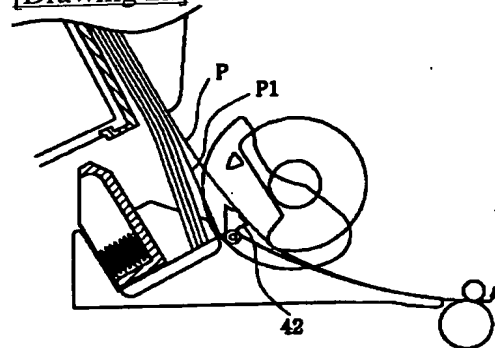
[Drawing 20]



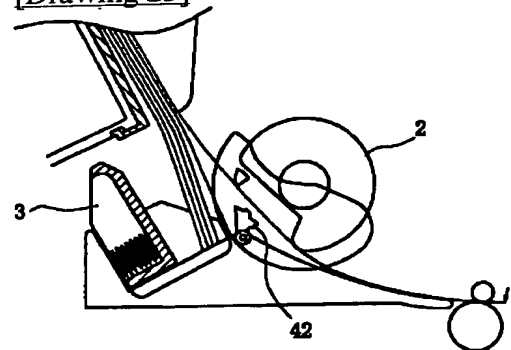
[Drawing 21]



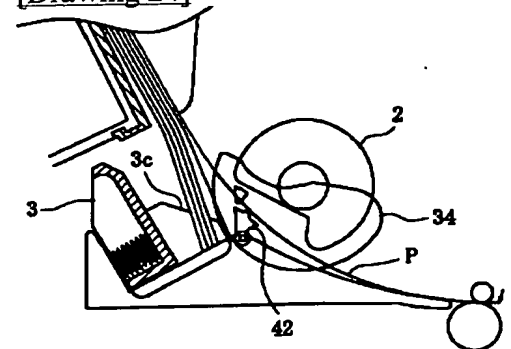
[Drawing 22]



[Drawing 23]



[Drawing 24]



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[Translation done.]